UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ALASKA
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KIMBERLY ALLEN, Personal Representative of the ESTATE OF TODD ALLEN, Individually, on Behalf of the ESTATE OF TODD ALLEN, and on Behalf of the Minor Child PRESLEY GRACE ALLEN,

Plaintiff,

vs. No. 304-CV-0131 (JKS)

UNITED STATES OF AMERICA,

Defendants.

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DEPOSITION OF RICHARD A. RUBENSTEIN, M.D.

February 22, 2006

RICHMOND, CA

Reported by:
DANUTA KRANTZ
CSR NO. 4782

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MR. GUARINO: This is Gary Guarino. I represent the United States.
THE VIDEOGRAPHER: Thank you.
The court reporter will please swear the witness.
RICHARD A. RUBENSTEIN, M.D.
having been sworn as a witness,
testified as follows:
THE VIDEOGRAPHER: You're on the record.
MS. McCREADY: Thank you.
EXAMINATION BY MS. McCREADY
MS. McCREADY: Q. Good afternoon, Doctor.
A. Good afternoon.
**Q. Is it Rubenstein?**
A. Rubenstein, yes.
**Q. Okay. Dr. Rubenstein, what did you do to prepare for this deposition this afternoon?**
A. I reviewed extensive documents, reviewed extensive literature, reviewed extensive depositions, I reviewed the expert reports of plaintiff and defense experts.
**Q. Okay. On the extensive documents, are you talking about Mr. Allen's medical records?**
A. Yes. And I also reviewed a CD of



his MRI scan -- excuse me, of his CT head scan of 4-19-03.
**Q. So you reviewed documents as well as the films that were taken at Providence Alaska Medical Center on 4-19-03; is that correct?**
A. Yes.
**Q. Let me just pull out -- in your report you had listed some records that you had reviewed. I will mark that.**
**(Document marked Plaintiff's Exhibit 1 for identification.**
MS. McCREADY: Q. Doctor, I am marking Exhibit 1, at least what was provided to me as your report that was dated November 29 --
A. Correct.
**Q. 2005. And really, I just wanted to focus on the medical records that you had listed in this report.**
**Did you ever -- is there any listing of medical records by Bates stamping numbers?**
A. No.
**Q. Have you gotten any correspondence from Mr. Guarino that sort of sets forth everything that he sent to you?**
A. Yes.



**Q. Did you have his correspondence at hand?**
A. Yes. Right. I do.
**Q. I would like to mark that as an exhibit, any correspondence you had with Mr. Guarino.**
A. If you mark on the underside of the -- you know what I'm saying?
**Q. Okay.**
**(Document marked Plaintiff's Exhibit 2 for identification.)**
MS. McCREADY: Q. And you've handed me your file, and is it the -- let me just ask. There is a December 20, 2005 letter?
A. All of the correspondence is in there.
**Q. So this is this whole stack; is that correct?**
A. Correct.
**Q. What I am going to do is put a Bates stamp -- I'm sorry, an exhibit sticker, Exhibit 2, on the back of the first page of that, but the whole thing will become Exhibit 2.**
A. Okay.
**Q. And then we will just copy it after**



**the -- at a break or after the deposition. Okay.**
A. Or if the records are -- they're probably not that extensive, but the way I generally do this is to have the court reporter send someone back here with their own copying machine to copy it, and then rather than, you know, her take the time after the deposition to do it.
**Q. Okay. We can talk about that when we go off record.**
A. Sure.
MR. GUARINO: Donna.
MS. McCREADY: Yes.
MR. GUARINO: Dr. Rubenstein is coming through clearly, but about halfway through or partway through some of your questions you start to fade, and I am wondering whether you are turning away from the microphone or whether it's just the line connection.
MS. McCREADY: I don't think it's the line connection. I just think it's the setup. I will try to keep my voice up.
MR. GUARINO: That was better. I heard that clearly all the way through.
MS. McCREADY: Okay.

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Q. In terms of literature, if you could -- I am curious what literature you have reviewed.
A. I have reviewed -- it's right here, if you want to go through it article by article.
Q. Okay.
A. Okay. Much of it is literature that was memorialized in your expert Susan Shott's bibliography, but there is additional literature, you know, from my own files.
Q. Do you have those separated out, like what you got, what literature was cited by Dr. Shott and what literature you sort of looked up on your own?
A. I do, by and large. There may be a couple of articles in the Shott file. Let me put it this way. Most of the articles in the Shott file were, you know, I already had in my files. There were some that I didn't, and, you know, they are mixed together really.
But I can say these articles here are articles that were -- clearly came from my information, but most of the Shott articles I already had in my bank of knowledge. It's just that they -- there was an overlap.

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Q. Sure. Okay. All right. I want to come back to that.
Anything else you did to prepare for deposition, today's deposition?
A. No, I don't think so.
Q. Did you talk to Mr. Guarino?
A. When?
Q. In preparation for this deposition.
A. Yes, I did talk to Mr. Guarino. Yes.
Q. Just for about how long?
A. You mean in terms of --
Q. Preparation --
A. Are you talking about today?
Q. I am talking about --
A. What are you talking about?
Q. I'm talking about in preparation for this deposition.
A. I think I talked to him about one hour on Sunday night, and I talked to him today for about maybe ten minutes.
Q. Then did you talk about -- I am just curious if you gentlemen discussed the other depositions that have been taking place.
A. Yes. I mean, that certainly was one of the topics we discussed, yeah. Yes.

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Q. All right. If you could tell me, what exactly is a neurologist?
A. A neurologist, or neurology, the specialty that deals with diseases of the central and peripheral nervous systems, the junction between nerves and muscles and muscles.
Q. What is the difference between a neurologist and a neurosurgeon?
A. Well, we think and they operate.
Q. Okay.
A. If you want to know the truth.
Q. I am sure you have been asked that question before. So you think and they operate?
A. Correct.
Q. What is the difference in training?
A. A neuro -- a standard neurology training program is one year of internship and three years of residency training and then additional fellowship years after that, if one wants to really subspecialize in any -- an area of neurology.
Neurosurgical training, I think pretty much in the good neurosurgical training programs, I think the standard training is about around five

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years or so after medical school.
Q. Okay. So are there -- do neurologists go through surgical residencies?
A. No.
Q. Then do you do surgery?
A. No.
Q. Are you board certified as a neurologist?
A. Yes.
Q. All right. Is board certification, is that something that you have to -- you have to be recertified after a particular period of time?
A. You know, they did have after many years, after I was board certified, they did have a recertification exam, and I think that has kind of gone by the wayside, you know. There were a few years when that was in vogue, and I have not heard anything more about recertification exams.
Q. When were you actually board certified?
A. I was board certified in 1976. I was elected to fellowship, which is a higher level of board certification, in 1982.
Q. Then have you been recertified since '76?

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A. No.
**Q. Or since '82?**
A. No.
**Q. All right. Are there subspecialties, then, in neurology?**
A. Yes.
**Q. And could you give me an example of what those might be?**
A. I mean, there is cognitive neurology, behavioral neurology, peripheral neurology, peripheral nerve disease, muscle disease, neurointensive specialization in neurology, neurorehabilitation.
**Q. Do you have any subspecialties?**
A. Yes, I do.
**Q. What would those be?**
A. I am board certified in electrophysiology, EMG and nerve conduction. I am, I think, have a special interest in traumatic brain injuries and behavioral or cognitive neurology.
**Q. So you are board certified in electrophysiology; is that correct?**
A. Correct.
**Q. That has to do with nerve**

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**conduction studies?**
A. Correct.
**Q. Then you have a special interest in traumatic brain injury?**
A. In cognitive neurology.
**Q. In cognitive --**
A. Or behavioral neurology.
**Q. Do you know how it was that you were selected to be an expert witness in this case?**
A. No.
**Q. What were you asked to do in this case?**
A. I was asked to review all of the records, depositions, et cetera, and formulate an opinion.
**Q. An opinion about what?**
A. About causation. In other words, whether Mr. Allen's subarachnoid hemorrhage was representative of a condition that could have reasonably been prevented had it been diagnosed in a timely fashion.
**Q. All right. And let me ask you this. What, in your training, practice, education, do you think allows you the background**

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**to give opinions about that in this case?**
A. Well, I am a neurologist. Subarachnoid hemorrhage is a neurologic disease. I have seen many, many cases of subarachnoid hemorrhage, but it's within the scope of my experience, my training and my expertise.
**Q. Let me, then, ask you some questions about, what is your practice? If you could describe for me, do you have a clinical practice, and if you do, if you could describe for me what sorts of patients you see.**
A. I have an outpatient clinical practice, and I don't do any hospital work per se. And in terms of my outpatient practice, the kinds of cases that I see are patients with headaches, patients with seizures, patients with strokes, patients with pinched nerves, patients with neuropathies, problems with their nerves, patients with spinal pain.
Those are pretty much the greatest preponderance of cases that I see.
**Q. Are we at your office where you actually have your clinical practice?**
A. Yes.
**Q. All right. So you don't see**

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**patients in the hospital; is that correct?**
A. Correct.
**Q. How many patients do you see a week typically?**
A. Well, I am in this office about two weeks a month, and I would say on average I see -- and I work four days a week. So in those days I would say I would see, you know, anywhere from eight follow-up patients perhaps and one to two new patients.
**Q. Okay. So you are actually working in a clinical practice two weeks out of the month approximately?**
A. About. Yeah.
**Q. And then there are four-day weeks. And how many hours a day are you working -- the days you are actually here working, what would you say?**
A. Probably six to eight hours a day. You know, with the dictations I do, six to eight hours a day.
**Q. Okay. Then there are -- I want to make sure I understand -- eight follow-up, could be -- and I realize these are not hard and fast numbers, but this is general ballpark,**

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**approximately like eight follow-up patients during the week?**
A. During the week, yes.
**Q. And then one to two new patients a week?**
A. Correct.
**Q. Is that right? Okay. Any other --**
A. No. Probably one new patient -- one to two new patients a day.
**Q. A day?**
A. You know, a day.
**Q. Okay. But the eight follow-up patients per week or per day, that's what I wanted to make sure I understood.**
A. Somewhere around there.
**Q. I am sorry. I didn't ask that very well.**
**Eight -- you would generally see follow-up patients during a week?**
A. No. Per day.
**Q. Per day. That's what I didn't understand.**
A. That includes, you know, at least on some of them, performing electrophysiologic studies.

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**Q. I don't want to spend a lot of time on that, but I do want to sort of understand that.**
**If you could describe that to me, what are these electrophysiological studies?**
A. Well, let's say somebody has a pinched nerve, like carpal tunnel syndrome, or somebody has a pinched nerve in the neck. I would do, you know, an electromyogram to see if they have evidence of nerve injury, or I would do a nerve conduction velocity study to see if they have evidence of focal compression.
**Q. Okay. The other two weeks out of the month, are you working in other clinics?**
A. I am working in another office.
**Q. Where is that?**
A. Marin County, California.
**Q. And if you could describe for me your practice at the other office.**
A. That is my forensic office.
**Q. When you say forensic office, what do you mean?**
A. Cases that I am involved in that are litigated cases.
**Q. Just so I understand, that is just a separate office in a different location that you**

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**would generally do the work, this medical/legal work; is that correct?**
A. Correct.
**Q. Approximately how many cases -- if you break down your time in terms of working, would it be half time in the clinic and then half time doing medical/legal cases?**
A. I would say that is about correct.
**Q. Do you do any teaching?**
A. No.
**Q. Okay.**
A. I did, but I don't do it anymore.
**Q. All right. How long ago was that?**
A. Well, I was assistant professor of neurology at UC Davis from about '76 to '78, then I was assistant clinical professor of neurology at UCSF from about '79 to '94.
**Q. Have you done any sort of teaching, that is, formal teaching in the university since '94?**
A. No.
**Q. About how many cases, that is, legal cases, are you consulting on at any one time roughly?**
A. You know, it really varies. I

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would say, you know, maybe sometimes none. It could be -- vary from none to maybe two to three.
**Q. At any given time?**
A. Correct.
**Q. How many in a year do you think?**
A. No way of knowing. I don't keep track.
**Q. You don't keep a list of cases?**
A. Well, if you figure, I take about three months' vacation a year. So I am in this office, you know, maybe two weeks a month, four days. So the litigated cases, or my litigation work is very variable. Sometimes it's none, and you know, sometimes it could be two to three. So I mean, I don't have any way of really characterizing how many cases I do per year or per month or, you know, that kind of thing.
**Q. How many cases are you working on right now aside from Mr. Allen?**
A. Aside from this one, I think about one or two others.
**Q. When I am asking you about working on -- I am just curious, do sometimes people send you records and then you review them that you never hear from them again or -- and would you**

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**the country or are there particular areas that -- where you mainly are doing expert work?**
A. Well, most, I would say, of the cases that I have worked on pretty much have been west of the Mississippi.
**Q. Have you ever had any training in emergency medicine?**
A. Well, not emergency medicine. You mean like treating heart attacks and pulmonary emboli and --
**Q. Like doing ER work?**
A. Well, I mean, I did ER work as an intern, and I'm thoroughly familiar with neurologic emergencies, but in terms of any ongoing work as an emergency room physician, let's say, no, I have not done that.
**Q. Let me ask this. Is emergency medicine a specialty within medicine?**
A. Yes.
**Q. Do doctors or medical students that want to become doctors actually do residencies in emergency medicine?**
A. Yes.
**Q. Have you done a residency in emergency medicine?**

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A. No.
**Q. When you talk about neurological emergencies, if you could just give me an example what that would be.**
A. Yeah. Like subarachnoid hemorrhage, intracerebral hemorrhage, myasthenic crises, traumatic brain injury.
**Q. Have you ever worked in an emergency room setting, I mean, aside from being in medical school?**
A. Well, I have -- maybe what you are confused about is, I have been in emergency rooms hundreds and hundreds of times consulting on my patients, you know, when I was doing hospital work.
But in terms of working in an emergency room and treating colds and sniffles looking in eardrums and that kind of thing, I have never done that.
**Q. Actually, that's what I do want to understand, the hospital work, the work you have done in emergency rooms.**
**Is that something where you would be called to an emergency room because one of your patients has presented in the emergency room?**

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A. Or I was on the emergency room panel and I would be called in to see, you know, a new acute patient that was just presenting himself in the emergency room.
**Q. Are you doing that sort of work now?**
A. No.
**Q. When were you doing that?**
A. The last emergency room work, per se, that I did was about 1997. So it was -- I stopped doing that essentially nine years ago.
**Q. When you were doing it, if you could describe for me what that practice was like then before 1997.**
A. Well, in -- I had two associates, one of whom I still have. And we covered an area of a half a million people in this area. And we were the only neurologists for half a million people. So, bigger than Anchorage.
And so we were extremely busy. And we covered two hospital emergency rooms in this area for neurology -- neurologic issues.
**Q. For neurologic consults?**
A. Yes.
**Q. So the emergency doctor would maybe**

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**call you in for a consult; is that right?**
A. Yes.
**Q. Have you done any of that work since 1997?**
A. No.
**Q. Would that be a situation where you would be called in after the emergency room doctor or care provider had evaluated a patient, determined, you know, that they needed a neurological consult or some other sort of consult?**
A. Well, you hit on a core issue here, you know, because it took a lot of education of emergency room physicians to not panic when somebody came in with neurological symptoms, and pick up the phone and call us and tell us to come right in and evaluate this patient, as opposed to a good emergency room physician doing a complete evaluation before he picked up the phone to call us, and then presenting the case to us on the phone and going through his neurologic examination and the differential, et cetera.
So it took a lot of years of self-education of emergency room physicians around this area before we got to the point where we

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would get calls with a very thorough evaluation, with a good, you know, physical and neurologic examination, to give us an idea of whether it really was an emergency or not.

**Q. How did you go about doing that, the -- in terms of educating emergency room --**

A. Lot of in-service talks, addressing it with emergency room physicians, when we directly saw them, you know, when we physically saw them in the emergency rooms, and gradually over time, I think with the emergency room specialty training programs, emergency room physicians became better and better trained. When I started in clinical practice in about, you know, 11-78 we had general practitioners who worked as emergency room physicians.

And the extent of emergency room physician training and specialty training programs just improved over time. They developed a board certification, et cetera. So they became better and better trained. And we are lucky to live around a top medical school here, you know, actually two top medical schools that really train very bright people, and some of them want to go into emergency room medicine.

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**Q. Okay. So it sounds like that -- over the course of -- I mean, were you doing that, then, between, let's say, '78 and '97, this sort of practice?**

A. Yes. 20 years essentially.

**Q. I do want to understand your experience, then, during that period of time dealing with patients with subarachnoid hemorrhages and/or aneurysms.**

A. You know, I saw many, many subarachnoid hemorrhages due to ruptured aneurysms and, you know, monitored their care, often in conjunction with a neurosurgeon. But certainly in the earlier years, we were neurointensivists. So we would admit them to the intensive care unit, be totally responsible for their care, you know, until the angiogram was done and the location of the aneurysm, if located, was discerned, and then the neurosurgeon by and large would take over.

**Q. Right. When you say many, many patients with subarachnoid hemorrhages, and I just do want to get some sort of sense of that. Over the course of a year, would it be, you know, ten or more like 100?**

A. No. You know, the incidence of

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subarachnoid hemorrhage, you know, is about, you know, 10 per 100,000 population or so. So in any given year in North America there are 30,000 cases of subarachnoid hemorrhage. That is in North America, perhaps worldwide.

And so I would say in any given year, you know, I might see three to five cases, three to six cases, of -- three to five cases, I would say, being conservative, of subarachnoid hemorrhage.

**Q. So in any given year three to five cases of --**

A. New subarachnoid hemorrhage from a ruptured saccular aneurysm.

**Q. Got it. And do you consider it to be, you know, 10 out of 100,000, or 30,000 people a year who actually have a subarachnoid hemorrhage, is that statistically significant to you? I mean, is that like, that is a statistic?**

A. That is just a statistic. Out of that 30,000 population, let's say there are 3,000 or so that really never make it to a hospital emergency room and die out of hospital.

**Q. Right. The ones that actually show up at the emergency room, do you have an opinion**

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**about the statistics on the numbers of those that are misdiagnosed?**

A. Misdiagnosed?

MR. GUARINO: The question broke up. Are you --

MS. McCREADY: I am asking about the number of the folks that actually, with subarachnoid hemorrhages that actually make it to a medical facility. I'm looking for -- if the doctor has an opinion or knows the number in terms of how many of those are misdiagnosed.

THE WITNESS: I think a small percentage are misdiagnosed.

MS. McCREADY: Q. Would you agree that at least the discussion of the misdiagnosis of subarachnoid hemorrhage is pretty widely discussed in the literature over the last few decades?

A. I wouldn't say that it's widely discussed. I mean, there certainly have been a number of papers about the misdiagnosis of subarachnoid hemorrhage, but I don't think that it's a topic of discussion that pops up every month in neurologic or neurosurgical journals.

**Q. Fair enough. But there are a number of papers that certainly have been**

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**published, say, over the last even 40 years about the problem with misdiagnosis of subarachnoid hemorrhage in an emergency room setting?**

A. Yes.

**Q. Okay.**

MR. GUARINO: Is there a question or is this a break?

MS. McCREADY: Oh, I'm sorry. I am looking at any notes.

MR. GUARINO: Okay. I didn't know if we faded out.

MS. McCREADY: No, I am just looking at my notes.

MR. GUARINO: Okay.

MS. McCREADY: Q. Would you agree that the classic symptom of a subarachnoid hemorrhage is head pain?

A. Yes. Headache.

**Q. Headache?**

A. Severe, excruciating headache.

**Q. How would you differentiate head pain versus headache?**

A. Well, pain in the head can be due to a number of causes. There is a broad differential of head pain, but severe excruciating

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headache, the worst headache I have ever experienced in my life, is a generalized headache, is rather pathopneumonic or should be alerting to the possibility of subarachnoid hemorrhage.

**Q. When you say pathopneumonic, what do you mean?**

A. In other words, if someone comes in de novo, in other words, there is no prior history of headache, and they say, I just experienced the worst headache, you know, a severe headache, came on within seconds, you know, I mean, just the peak headache intensity, evolved over seconds, maybe a few minutes, you know, certainly, any neurologist would say, you know, state that the primary diagnosis to rule out is a subarachnoid hemorrhage.

**Q. Going back to your experience working in the ER, I am curious whether or not you had ever been in the situation where you had a patient come to you first as opposed to going and being screened by an emergency room care provider, where they came to you first with a complaint of acute headache.**

A. I have seen thousands and thousands of patients with headaches. And the

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characteristic of a subarachnoid hemorrhage headache is alarming, acute in onset, with peak headache intensity arising within a second or within a few seconds of onset, perhaps a few minutes. At least in one paper it said it can evolve over a few minutes. But most of the papers say the characteristic onset is within seconds.

And that is generally confluent with my experience as well. And, you know, most of the patients that I can recollect that hit a hospital emergency room with a subarachnoid hemorrhage not only had severe headache which arises de novo, you know, from someone without really a previous background of headaches, but is also accompanied by neurologic signs, focal neurologic deficits, stiff neck, diplopia, seizure, et cetera.

So there is every indication that there is something pretty ominous going on.

**Q. But what I am trying to understand is, I understand you have seen thousands of patients with headaches. And is that generally -- is that mostly in the clinical setting -- sorry, in the clinic setting where patients are coming to your office and seeing you on an out-patient basis?**

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A. Well, I have seen patients with headaches in the emergency room. I should say that, you know, by far and away the greatest preponderance of headaches in general and headaches that are severe and excruciating in onset are benign.

So that the -- by far and away, although headache visits to the emergency room are very common. I mean, that is one of the more common symptoms that emergency room visits occur. I think the statistics are something like one percent of all emergency room visits worldwide are for headache.

And by far and away, the greatest preponderance of those visits, including excruciating, explosive headache, are for benign conditions.

So I think that it takes ancillary signs and symptoms to warrant an enhanced index of suspicion that there is an intracranial process going on.

**Q. Would you agree that one of the most common associated symptoms of a subarachnoid hemorrhage is vomiting and nausea?**

A. No, I wouldn't.

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familiar with a subarachnoid hemorrhage presentation?
A. Yes.
Q. Would you agree that emergency room care providers should consider subarachnoid hemorrhage when a patient presents with their head hurting?
MR. GUARINO: Donna, that faded out. I heard half of the question.
MS. McCREADY: Q. Would you agree that the emergency room care provider -- sorry. Let me start over.
Would you agree that emergency room care providers should consider a subarachnoid hemorrhage when the patient presents to the ER with their head hurting?
A. I would not agree with that.
Q. Why not?
A. Because you didn't qualify the question. You need to qualify the question and be very specific. I mean, are you referring generically, are you referring to Mr. Allen specifically in terms of a patient who is a chronic pain, chronic headache -- you know, he had a long history of headache before this.

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In someone who has chronic headaches, who is on narcotic medication, patients who have a preexisting history of headache as opposed to someone who arrives in an emergency setting de novo, you know, without any prior history of headache, and has a severe, excruciating headache, the worst headache they have ever experienced in their life, you've got to be very specific.
In the one instance of a patient like Mr. Allen, who was a chronic pain patient, chronic headache patient, on narcotics, on a narcotic contract, or somebody with preexisting migraine, frequent migraines, et cetera, in other words, a chronic headache patient, certainly someone who presents in an emergency room, the diagnosis of subarachnoid hemorrhage would not be high on my differential.
Q. And the question is not whether or not it's high on the differential. Should it be considered?
A. I don't even think it needs to be considered, you know, unless there is something that is sufficiently atypical about the presentation that would warrant an elevated level of suspicion that there was something new going

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on, as opposed to someone who presented without any prior history of headache, you know, as I said, had a severe excruciating headache, obviously then, the first thing you would think of would be a subarachnoid hemorrhage.
Q. Would you agree that once a patient -- assume for a moment there is a high suspicion of a subarachnoid hemorrhage, would you agree that the standard of care is then to order a CAT scan?
A. Yes.
Q. Would you agree that a CAT scan, generally, the sensitivity is that it will pick up 90 to 95 percent of bleeds?
A. About 95 percent of subarachnoid hemorrhage, yes.
Q. Would you agree if that was -- if a CT was negative, then you would go do a lumbar puncture if you had a high suspicion -- index of suspicion of a subarachnoid bleed?
A. If somebody presented with a sentinel headache that was, you know, as I said, arose basically de novo out of nowhere, severe headache, the sequence of events certainly would be a CT. If that was negative, then a spinal

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fluid evaluation.
Q. At least in your experience and your review of the literature, CTs pick up most, I mean, 95 percent of bleeds?
A. Correct.
Q. Would you agree that, just in general, talking about the --
A. Let's say, CTs pick up about 95 percent of acute subarachnoid hemorrhage if done, you know, within the first 12 to 24 hours after the bleed. You know, by, let's say, five days after the bleed, the sensitivity of the CT is about 50 percent.
Q. Sure. But in at least that first, did you say 24 hours?
A. 24 hours.
Q. Right. It's going to have a 95 percent sensitivity rate?
A. Correct.
Q. I just want to ask some general questions about treatment of patients who are diagnosed with subarachnoid hemorrhage.
It sounds like that is at least where your area of expertise is. You worked in terms of treating patients with subarachnoid hemorrhage?

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ischemia or vasospasm.
**Q. The triple H's, hydration --**
A. Hydration, hemodilution and hypervolemia.
**Q. Okay. But why would you measure -- I mean, why would you monitor blood pressure?**
A. Because you want to make sure the blood pressure is not too low, you know, and it is staying within a range, within a very specific range that has been shown at least to be beneficial in helping to prevent vasospasm. And you would monitor blood pressure very closely just in general, because, you know, as I said, there are cardiac complications of subarachnoid hemorrhage, et cetera.
**Q. What if the blood pressure gets above 220?**
A. Then it probably would be treated.
**Q. What is the risk of it getting too high?**
A. I don't know. It's very -- each case is different.
**Q. What are some of the downstream consequences --**
A. Of blood pressure getting --

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**Q. -- getting too high?**
A. Well, if is there a hypertensive crisis, they could have an intracerebral rebleed again. The aneurysm could rebleed. The biggest issue is rebleeding is most common in the first 24 hours after -- it's said to be about a 20 percent incidence of rebleeding within the first 24 hours after the initial hemorrhage. So the rebleeding is the big worry.
**Q. Have you seen any literature to counter that, that most patients actually rebleed after the first 24 hours?**
A. After the first 24 hours?
**Q. Yes.**
A. Well, there is some literature that takes issue with the fact that the incidence is highest within the first 24 hours, but I think most modern-day studies or most recent studies believe that rebleeding is highest in the first 24 hours, albeit that is the whole theory behind emergency surgery.
**Q. Are those the studies -- are those --**
A. Yes, there are a couple of studies in here --

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**Q. -- in your stack that you have here today?**
A. Yes.
**Q. That discuss rebleeding within the first 24 hours?**
A. Yes. As a matter of fact -- I probably can locate it. This is the good one. Nadich's study says most studies show the highest risk of rerupture to be within the first 24 hours, often within the first six or 12 hours, where others have shown the highest risk to be between days four and nine or after day ten or found no period of higher risk.
But they found in their study that early aneurysm repair was performed whenever feasible, because there -- and this is a 2005 paper from Columbia -- that the highest incidence or risk of rebleeding was in the first 24 hours.
**Q. When you say early intervention, that is the term you used, you might have said early intervention?**
A. Right. Early intervention.
**Q. Does that mean early surgical intervention?**
A. Endovascular or surgery. Usually

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in these cases endovascular coiling is done at the time of the angiogram.
**Q. In what percentage of cases?**
A. I think most cases of endovascular coiling are done, if the patient is stable, of course, at the time that the angiogram is done and the aneurysm is diagnosed.
**Q. Do these studies -- and these studies meaning, do you have any studies on your desk in the stack of papers that you have on your desk that discuss when usually the angiogram is done, that is, in terms of time after presentation or diagnosis of the subarachnoid hemorrhage?**
A. It's done as soon as possible.
**Q. Right, but I am just curious, do you know generally when that occurs?**
A. Well, the only thing I can say, which I thought was actually quite interesting, was that, again, in this Nadich paper, I think this is an important statement. He notes that, "The more liberal application of endovascular therapy at the time of initial angiography" -- so that means angiography is done right away if the patient is stable -- "may also reduce the risk of early rebleeding, since surgery after angiography

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is often delayed by six to 12 hours."
So there is a delay, characteristically, in getting mobilized to do surgery as opposed to endovascular coiling, which could be done right at the time of the angiogram.
**Q. And surgery meaning clipping versus endovascular surgery?**
A. Correct.
**Q. What would be the importance of giving a patient a calcium blocker?**
A. Yes.
**Q. What would be the reason for doing that?**
A. That is to reduce the DCI, delayed cerebral ischemia. That has been shown to reduce the incidence of vasospasm.
**Q. How about the stress -- medication for stress --**
A. Anti-ulcer medicine.
**Q. Why would you do that?**
A. Just to prevent a stress ulcer and bleeding out from an ulcer, dropping the blood pressure.
**Q. Is that sort of a common risk of people with subarachnoid hemorrhage bleeds?**

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A. Yes.
**Q. How about the anticonvulsants? Why would you give a patient --**
A. So they don't have a seizure. And then, you know, a seizure would increase their risk of rebleeding.
**Q. Are patients with subarachnoid hemorrhages at risk of vomiting? Would you ever give a subarachnoid hemorrhage patient an anti-emetic?**
A. You mean after they present to the --
**Q. Yes, after they present -- after they are diagnosed.**
A. They are in the ICU and in coma, you mean?
**Q. No, I am sorry. After a patient who has been diagnosed with a subarachnoid hemorrhage.**
A. Yeah.
**Q. We were talking -- the subject is the standard of care in terms of how you would treat them and where you would put them. And I am curious whether or not is it typical to give a patient who has been diagnosed with a subarachnoid**

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**hemorrhage an anti-emetic, something that --**
A. Well, I mean, it would really depend on what was the cause of his -- was the cause raised intracranial pressure? You know, if the cause was raised intracranial pressure, we would start him on Mannitol, an anti-osmotic agent, and that would probably take care of the nausea and vomiting. So it really depends on what the cause of the nausea and the vomiting is.
**Q. Would you monitor a patient who has been diagnosed with a subarachnoid hemorrhage? Would you monitor them for increased ICP?**
A. Yes, sure.
**Q. ICP meaning increased intracranial pressure?**
A. Yes.
**Q. How would you do that?**
A. Certainly by the initial imaging study, that would be done if it showed any evidence of brain swelling or brain edema.
And if there was any evidence, let's say, of any impending catastrophe, such as an intraparenchymal hematoma, a herniation syndrome, et cetera, whether -- you know, probably not an intracranial pressure monitor -- you know, an

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intracranial monitor may be inserted, but I think that is variable and up to the neurosurgeon.
**Q. Can you also measure it by just evaluating the patient's level of consciousness?**
A. Sure. Yes.
**Q. Not necessarily doing some sort of invasive procedure, but at least monitoring what the patient's --**
A. Yeah.
**Q. -- neurosigns are?**
A. Sure.
**Q. Would that be a way of doing that?**
A. Yes.
**Q. Would it be important to monitor the fluid intake of a patient if a patient has been diagnosed with a subarachnoid hemorrhage?**
A. Yes.
**Q. Why would that -- why would you want to monitor that?**
A. Because you want to make sure that they are adequately hydrated, and maybe increase, you know, increase their hydration to prevent the development of the vasospasm. You don't want to hydrate them to the extent that you are going to put them in congestive heart failure, but you want

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my notes so we can finish up.
THE VIDEOGRAPHER: The time is 5:15, and this is the end of tape No. 2 in the deposition of Dr. Richard Rubenstein. We are off the record.
(Short recess.)
THE VIDEOGRAPHER: This is the beginning of tape No. 3 of the deposition of Dr. Richard Rubenstein. The time is 5:22. We are back on the record.
MS. McCREADY: Q. And, Dr. Rubenstein, just a couple of other questions about your report. I just want to understand.
It's your opinion it's more likely than not that Todd Allen did not have a sentinel bleed or any aneurysm the morning of April 19; is that right?
A. Well, he obviously had an aneurysm in the morning --
**Q. In the morning -- I am sorry.**
A. Well, I mean, he had an unruptured aneurysm, obviously, in the morning of, you know, so to qualify your statement --
**Q. Thank you. Let me make sure.**
**It's your opinion that he didn't have a bleed or a ruptured aneurysm the morning of**

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**April 19?**
A. Yes. I think it's more likely than not that this represented an episode of real breakthrough pain that he had from his chronic preexisting condition. And, you know, is it possible that he had a sentinel headache? Anything is possible, but I don't think that he ruptured the aneurysm until 2:00 that afternoon.
**Q. Then in your opinion, then, because part of your report is, okay, even assuming he had a sentinel bleed or some sort of a bleed that morning, there's really nothing that could have been done for him; is that your opinion?**
A. Well, I am -- you know, if he had a sentinel hemorrhage, a sentinel bleed, a warning leak, let's say, which I don't believe he had, I don't believe there was sufficient accompanying symptoms to warrant a higher index of suspicion that he get a CT scan or an LP.
But let's say, under ideal circumstances, let's say, hypothetically, that, you know, a sentinel headache had been suspected, he had obtained a CT, which I think in the greatest likelihood, or would be more likely than not to have been negative, and that he had had an

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LP, and that he then had -- and it had been diagnosed, let's say he had xanthochromic spinal fluid, and then he went on to be transferred, have angiog -- you know, transferred to either Providence or Alaska Regional, have the angiography, et cetera, we don't know where the aneurysm was, we don't know if it was in an accessible versus inaccessible location, we don't know if it would have been a candidate for endovascular treatment versus surgical treatment.
There are a lot of unknowns. But I think what is certain, that is even under optimum circumstances, had it been diagnosed, that he would have rebled that afternoon and died no matter what had been done.
**Q. What is that based on, this assumption that he would have just rebled and nothing could have been done for him?**
A. Well, because, one, just in terms of the -- I believe that he rebled sometime right around 2:00 p.m., you know, when he laid down to take a nap. I believe he bled, you know, at the time he went to sleep, to take a nap.
**Q. My understanding is that it's your opinion that it's more likely than not that that**

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**is when he actually bled, not that he rebled?**
A. Yes.
**Q. But then assuming, you know, for just the purposes of -- I want to understand the rest of your opinions that, even assuming he had some sort of a sentinel bleed that morning, it's your opinion that he would have rebled that afternoon and nothing could have been done for him to change his outcome? That's my understanding.**
A. Correct.
**Q. Okay. That's what I wanted to understand, what that is based on.**
A. It's based on, from what I know to be the mechanics of treating an aneurysm in Anchorage; in other words, I don't believe that, you know, treatment with Mannitol or treatment with anti-osmotic agents or keeping his head up, you know, as Dr. Cantu -- would have had any impact on his outcome. And I will go into why not.
But that aside, I just think that the mechanics of working this up in a timely fashion and not knowing where the aneurysm was, whether it was accessible, inaccessible, et cetera, whether he was a candidate for endovascular surgery or

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even if he was a candidate for acute operative intervention, it does not appear to me that it would have happened in a timely enough fashion in Anchorage at Providence or Alaska Regional Hospital to have prevented his hemorrhage.

**Q. So --**

A. By the way, as I said, irrespective of treatment anywhere, the mortality of subarachnoid hemorrhage is about 50 percent of all cases.

**Q. Right. But in this case, if I understand what you said, it sort of boils down to the logistics of the fact that he had this aneurysm when he was in Anchorage?**

A. Yes. Let's put it this way. He had this aneurysm probably for a long time.

**Q. I'm sorry, the rupture.**

A. Probably for many years, but it was an asymptomatic aneurysm.

**Q. Sure.**

A. You know, it's said, by the way, that about 9 percent of all autopsied patients are discovered, incidentally, to have incidental asymptomatic aneurysms.

**Q. Right. I am sorry that I wasn't**

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**clear about the -- distinguishing between the ruptured and unruptured.**

**But if I understand your opinion that it's -- because Todd Allen, the logistics of him actually getting worked up and treated because he was in Anchorage, that just would lead you to believe that they just --**

A. It wouldn't have happened.

**Q. It wouldn't have happened.**

A. He would have been dead no matter what had been done.

**Q. Who have you -- have you talked to anyone about the logistics of dealing with a patient with an aneurysm or a ruptured aneurysm in Anchorage?**

A. I mean, I've reviewed in detail all of the medical records. I have looked at Dr. Levy's report. I have talked to Mr. Guarino about what the logistics were in Anchorage, and, you know, that there are three neurosurgeons in the state. It's not clear to me whatsoever that either Godursky or Craelic or Cohen were doing aneurysm surgery on 4-19-03 in Anchorage.

And I think even if they were, under optimum circumstances, they would not have

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operated on him within, you know, six to 12 hours of the presentation of the sentinel hemorrhage at 7:10 a.m., if we're presuming that that's what occurred, and that his workup would not have been completed or substantially done by the time that he rebled to have prevented his demise.

You know, all of this is total speculation. You don't even, one, know that he had an aneurysm. We know that he had a subarachnoid hemorrhage. You know, the greatest likelihood is certainly it was an aneurysmal subarachnoid hemorrhage. We don't know the location, we don't know the accessibility, we don't know the best method of treatment.

**Q. Right. And we've got a lot of things that we don't --**

A. Circumstantial evidence.

**Q. Well, yeah. We don't know because he wasn't worked up that morning, on April 19th at ANMC, so we don't have a lot of information.**

A. As I said, it's my belief -- it's my opinion, let's put it that way, to a reasonable degree of medical probability that -- and certainly, an imaging study that morning I believe would have been normal.

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**Q. And it wouldn't have told you anything?**

A. It wouldn't have told you anything.

**Q. Did you talk to Dr. Levy?**

A. No.

**Q. Have you talked to any of the neurosurgeons in Anchorage?**

A. No.

**Q. Do you know Dr. Cohen or Dr. Godursky or Dr. Craelic?**

A. No. I don't know any of them.

**Q. Really? Okay.**

A. I have seen their names plenty of times, but I don't know them.

**Q. Sure.**

**Aside from talking to Mr. Guarino and reviewing the records and the reports in this case, is there anything else that you are -- you are relying on or you looked at in terms of the coming to the conclusion that the logistics of Mr. Allen having this ruptured aneurysm in Anchorage created problems with him getting timely treatment that would have changed his outcome?**

A. Right. I don't believe there was anything that would have been done that would have